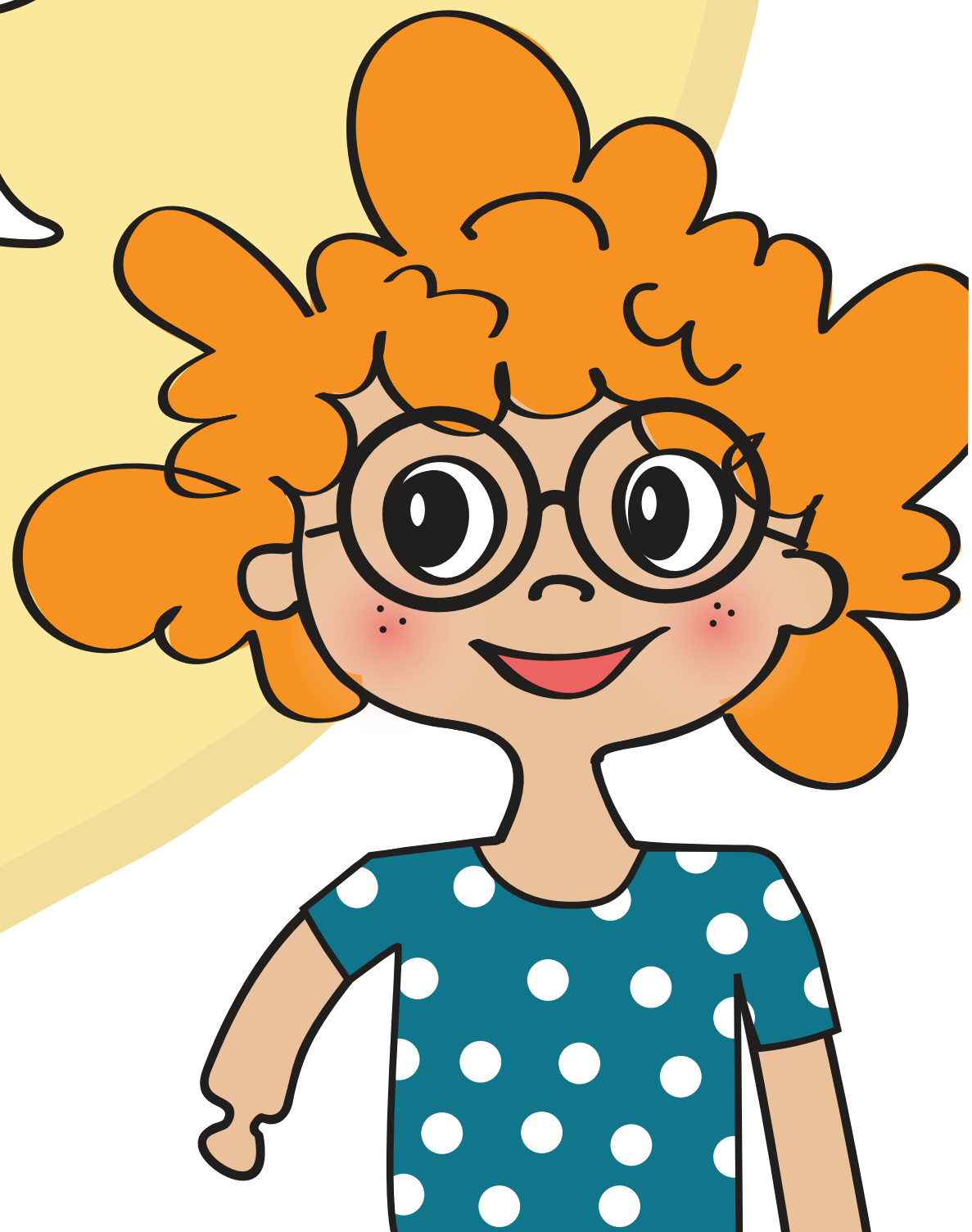




Amber
The
MAKER

Amber the Maker
Written by:
Ann-Louise Davidson
Elizabeth Lakoff
Illustrated by: Alina Gutierrez

To all children,
You can imagine a better future.
You can stand up to bullies creatively.
You live in the maker era, and you can
make anything you want.
Ask questions.
Never stop being curious.
Don't quit, ever.



Amber lost her arm wrestling a crocodile.

Or at least, that's what she told people when she was little.

Her dad says that Amber always had a very active imagination.

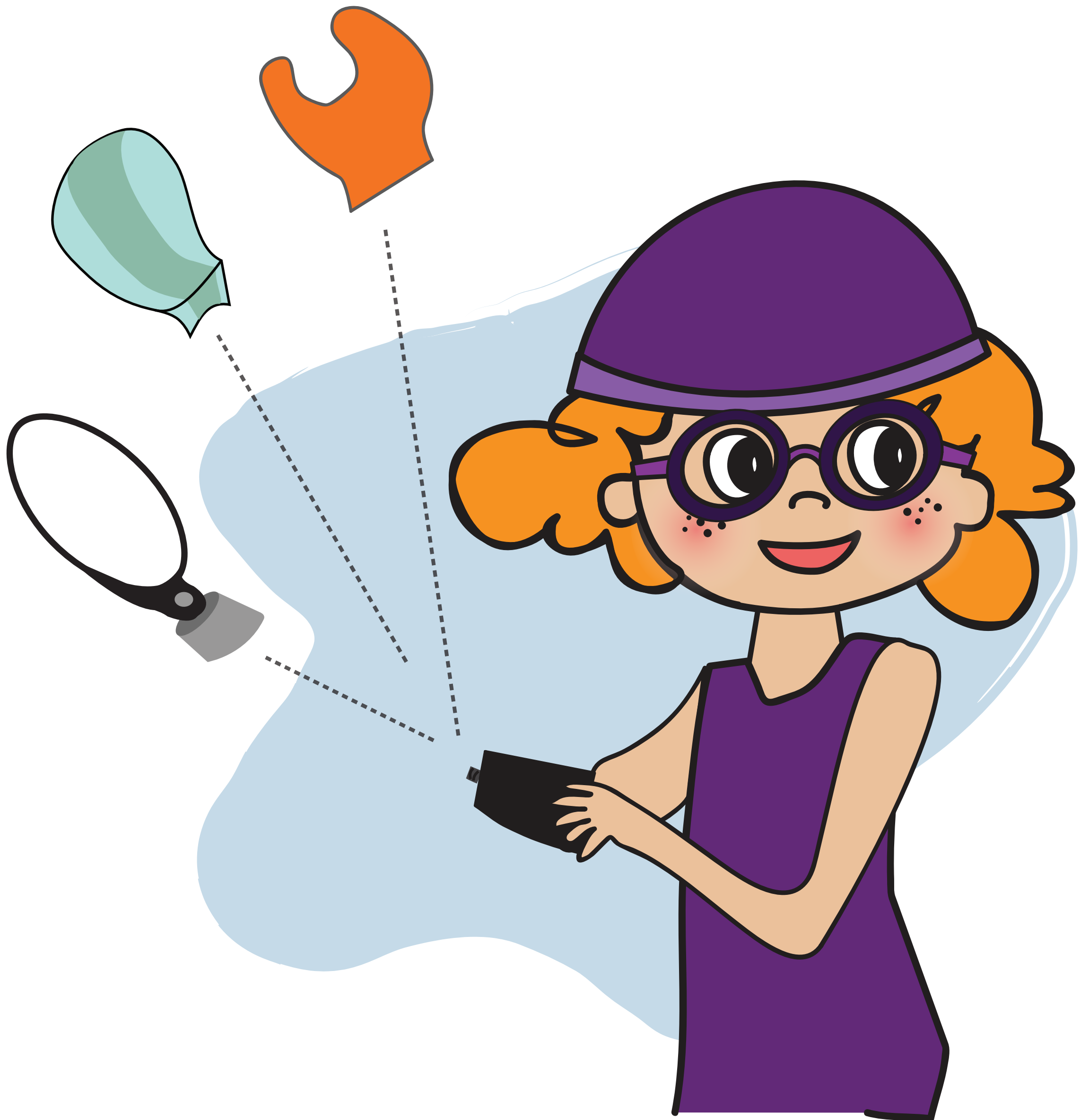


Amber is now 8 years old. She mostly just sticks to the truth.

The truth is that Amber was born with a right arm that stopped below the elbow.



Amber never missed having a hand on her right arm. She is able to do everything other children do, but sometimes she needs a bit more time. Sometimes she needs the help of a prosthetic device.

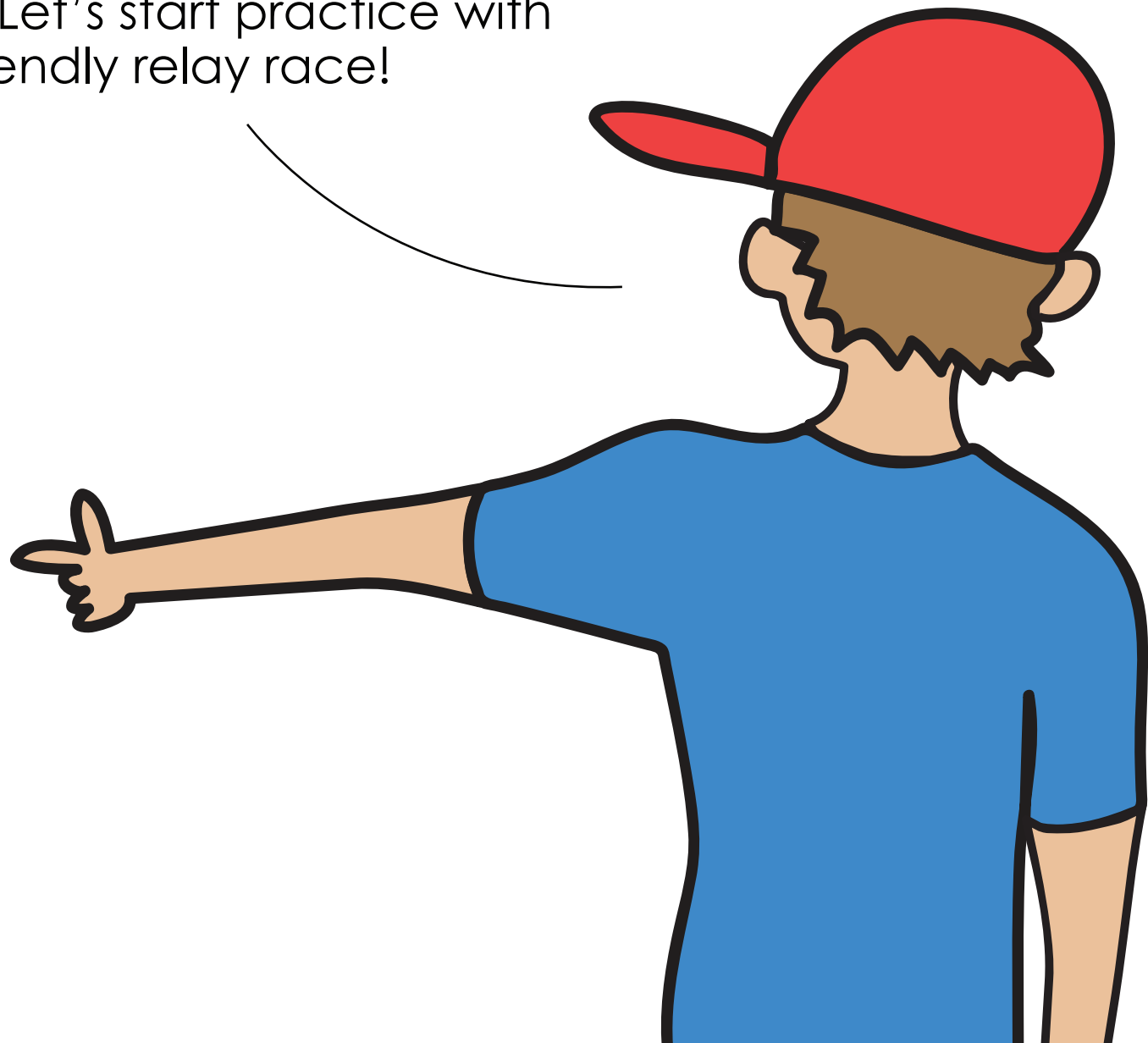


Amber has an everyday prosthetic and a sport prosthetic. Her sport prosthetic is neat because she can attach different hands for different activities.

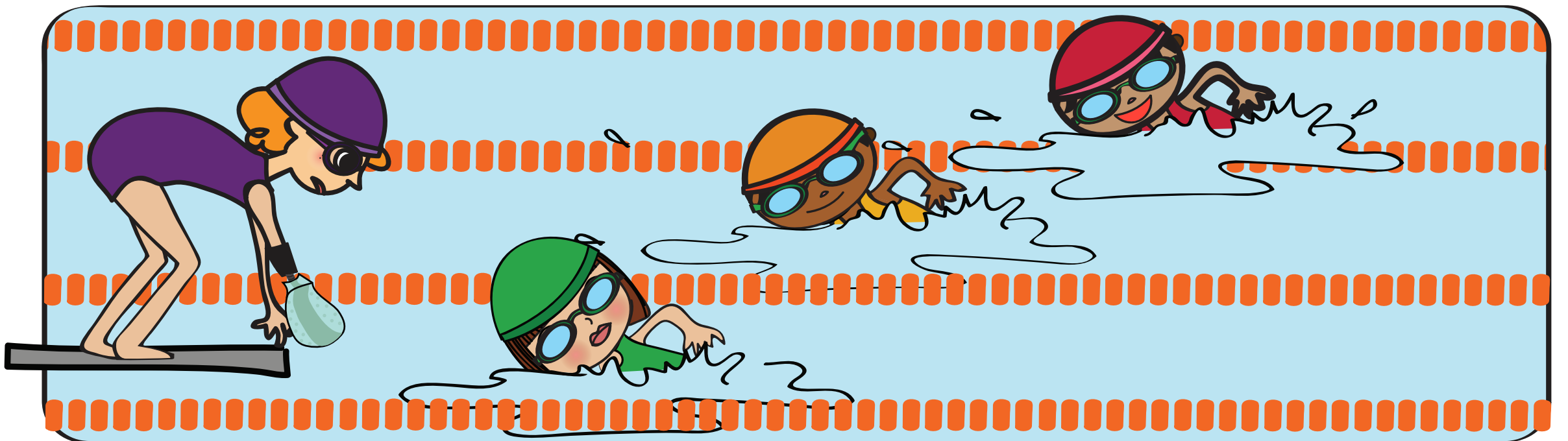
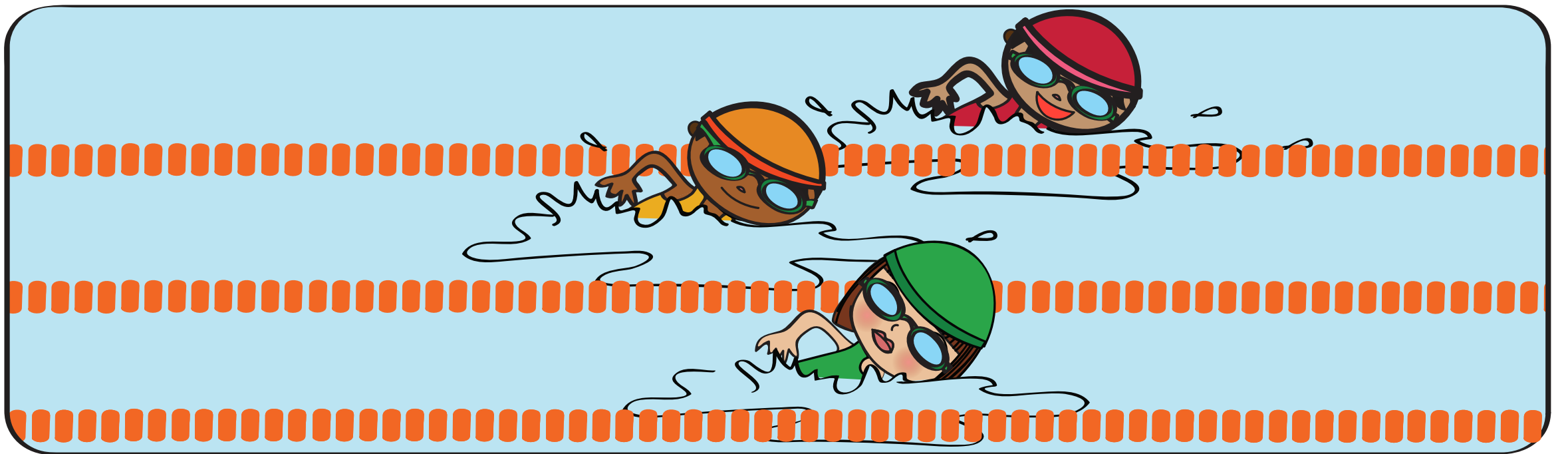
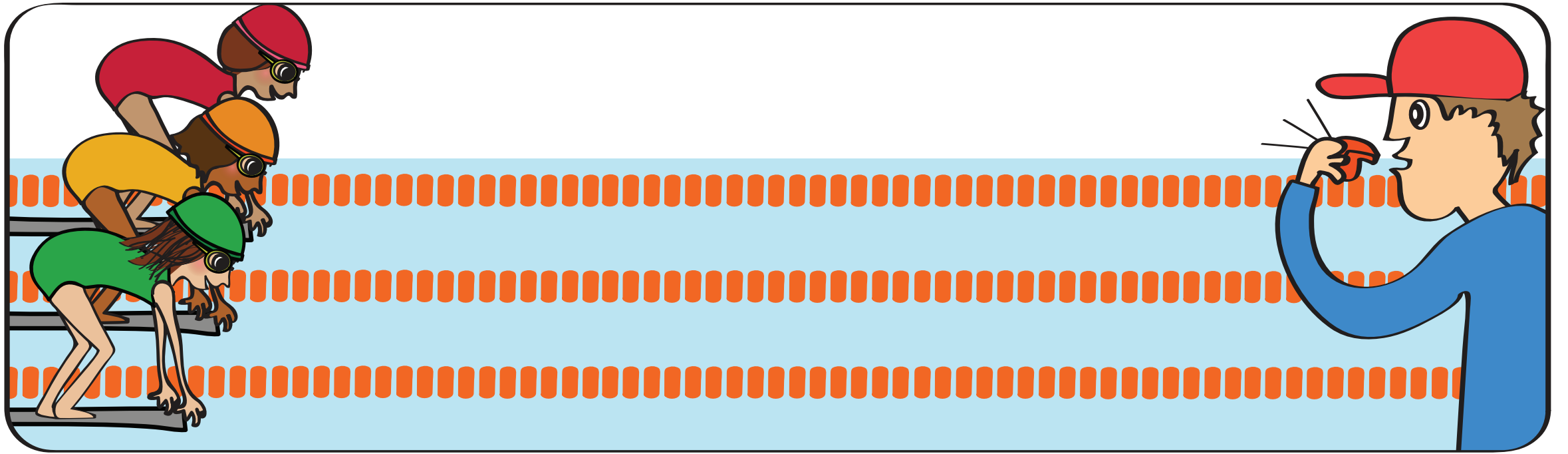
Amber has just joined the swim team and is excited to try out her new swimming hand.



Okay kids! Let's start practice with a friendly relay race!



Today is Amber's first swimming practice.



The coach blows his whistle and the first racers in each line step onto the starting platform.

The coach blows his whistle again and the first racers splash into the pool.

Lana is very fast. She beats all the other racers back to the platform. When Amber's turn comes, her team is far ahead of the others.

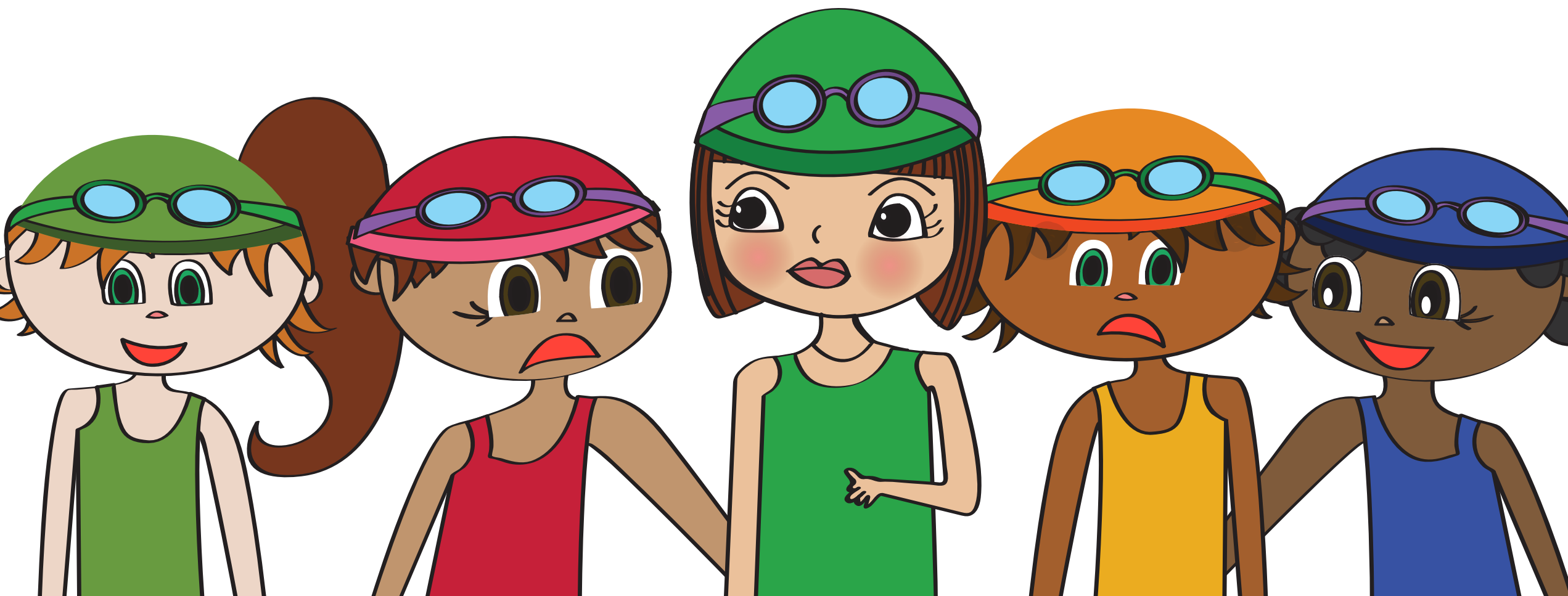
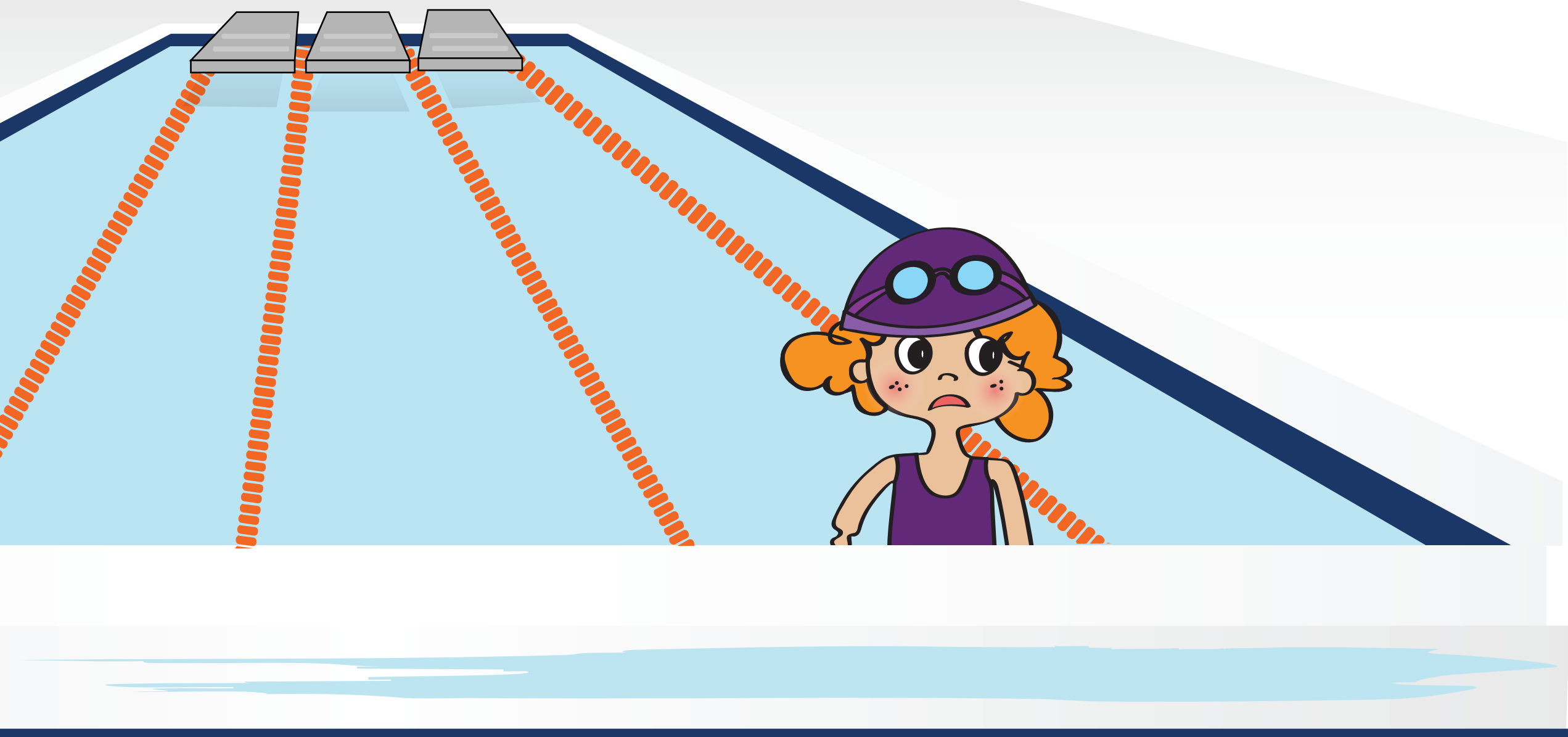
Go faster Amber!

**You need to hurry up,
we are losing!**



Something is wrong. Each time Amber lifts her prosthetic hand out of the water it feels too heavy. Amber can hear the other girls calling out to her.

Amber finishes last.

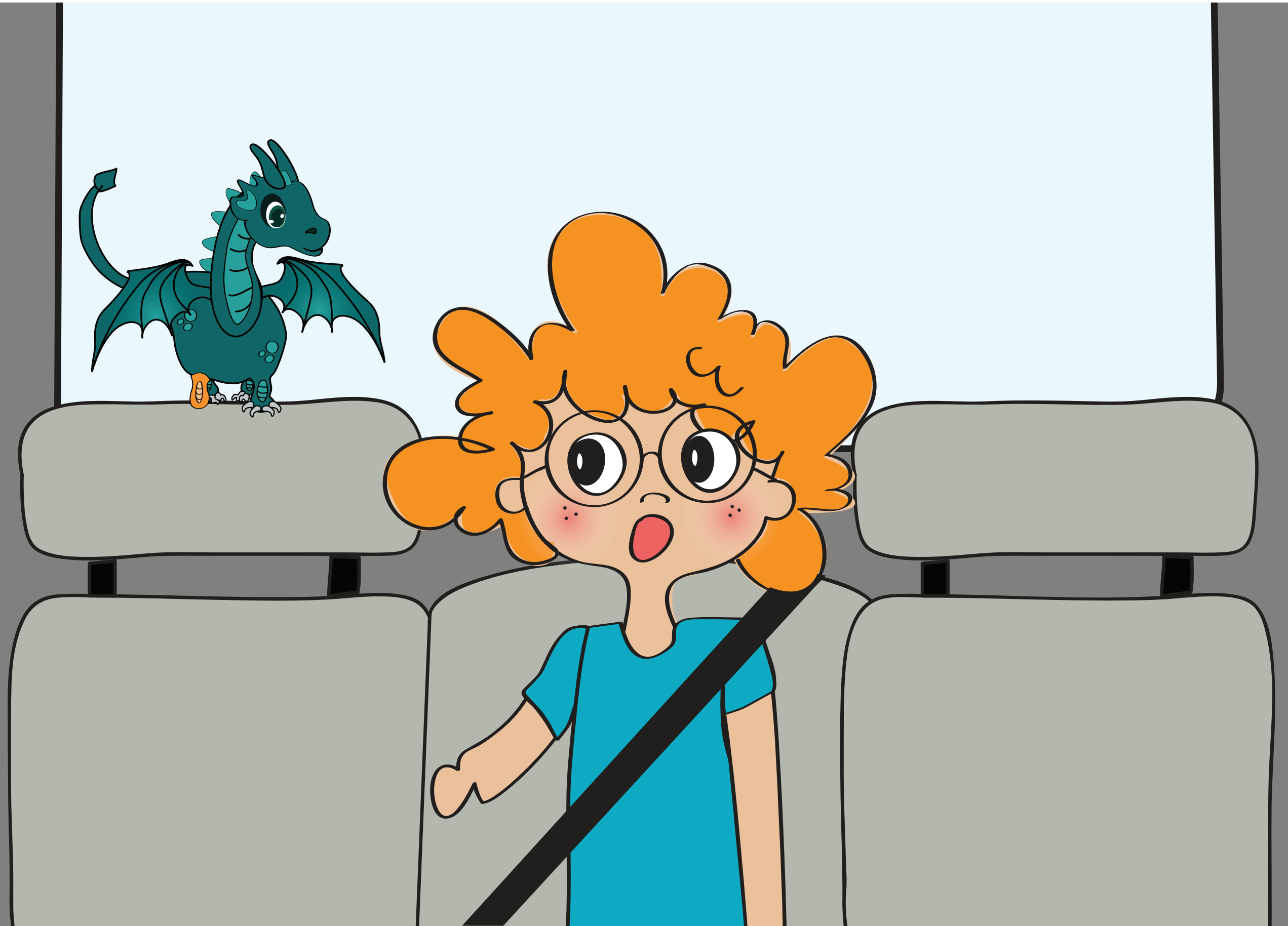


“She made us lose! She is way too slow. I knew that having an amputee on our swim team was a bad idea,” Lana says.



“What’s wrong sweet pea?” asks Amber’s dad when he picks her up from swim practice.

“Nothing! I just don’t want to go to swim practice ever again!” says Amber.



“That’s too bad. Swimming cools my fire,”
mumbles Gentling.

“Who are you?” says Amber.

“I am Gentling.”

“Are you a dragon?”

“Yes! But don’t worry, I won’t hurt you.
I heard you say you never want to swim
again and I thought I could help you.”



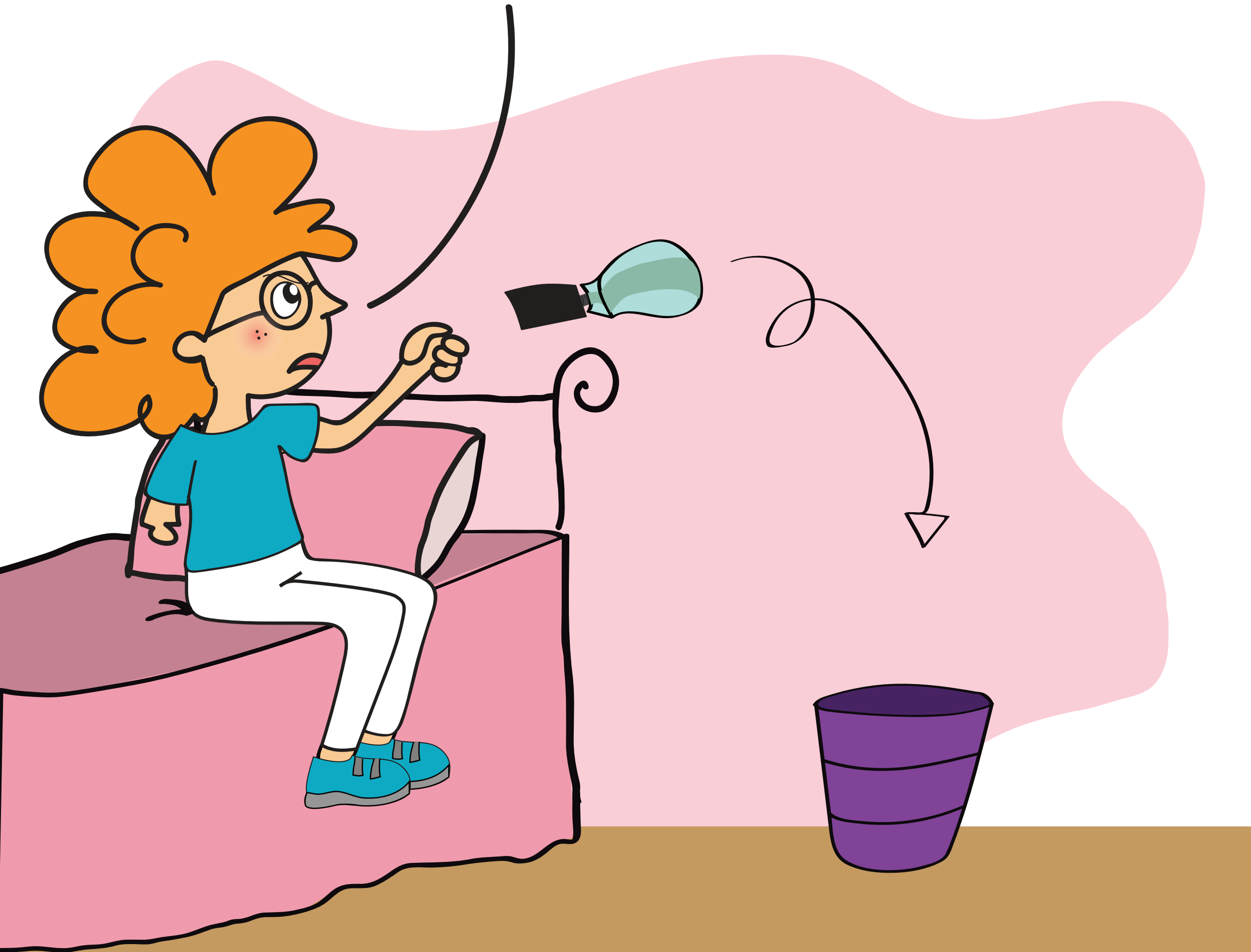
Amber notices that Gentling has a prosthetic foreleg.

“What happened to your foreleg? Did you fight a crocodile?” Amber asks.

Gentling responds, “Ah haha! That is the funniest story I ever heard! I was born this way. My mom said I was a special dragon. It was okay when I was little, but then I grew up. All the other dragons played and I was not able to follow. I often felt frustrated and hurt.”

Amber responds, “Yes I know, others can be mean. Do you want to come home with me? I’ll show you my room.”

STUPID HEAVY THING!



Amber arrives home, runs to her room, and slams the door. She takes her swimming hand out of her bag and throws it in the garbage.

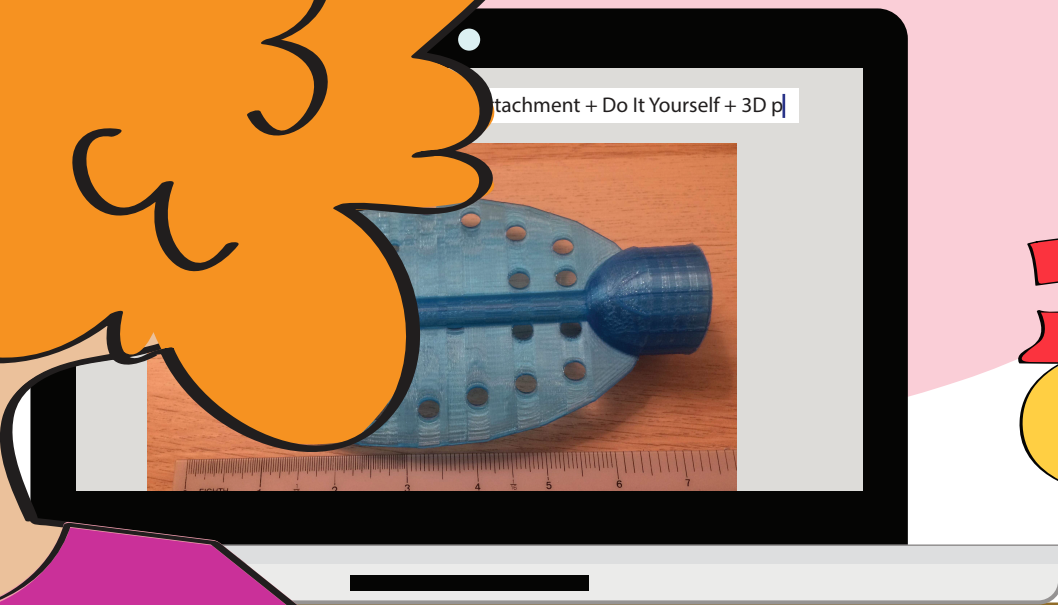
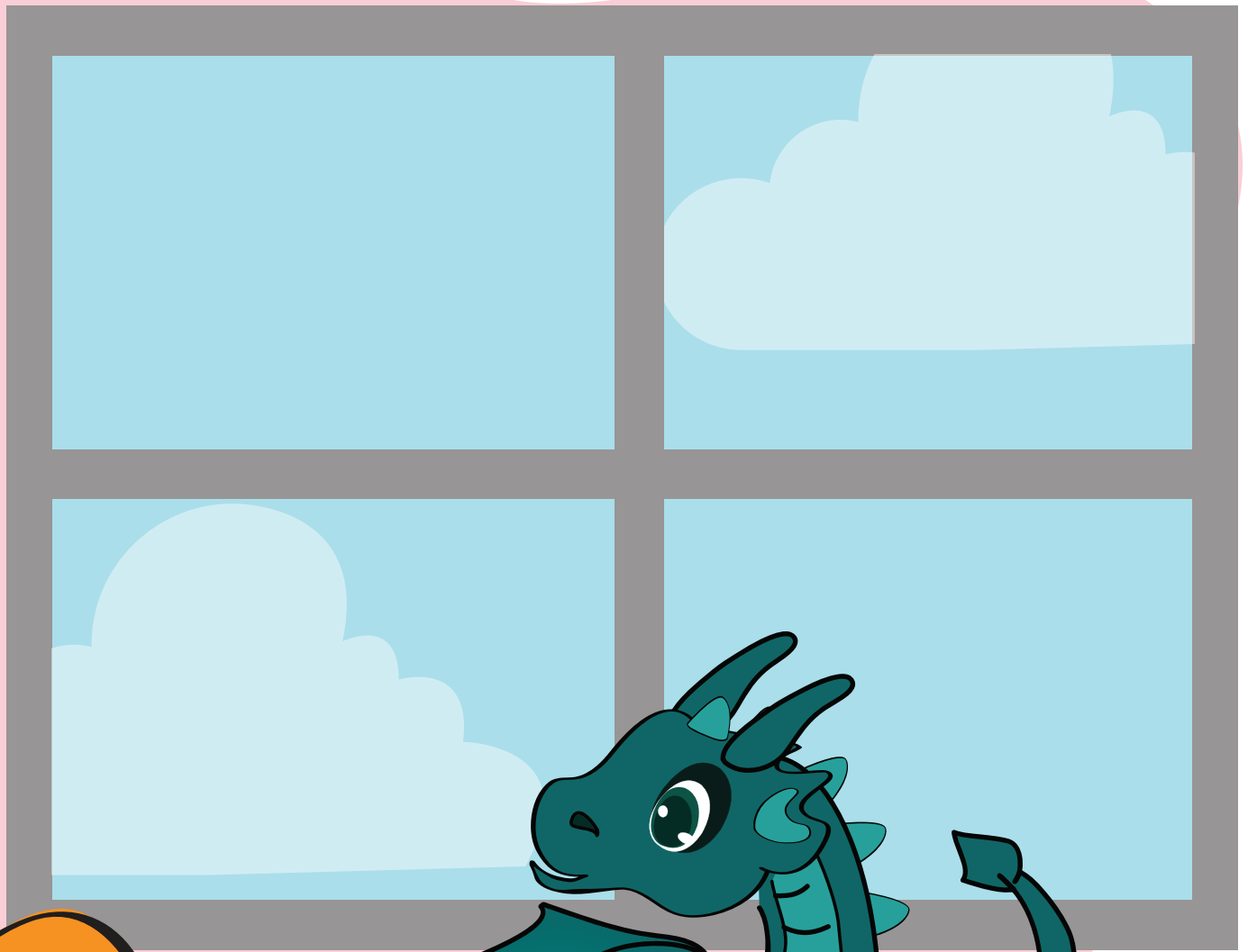


Amber's mother comes into her room and sees her prosthetic in the garbage.

“Oh Amber! Why did you do that?”

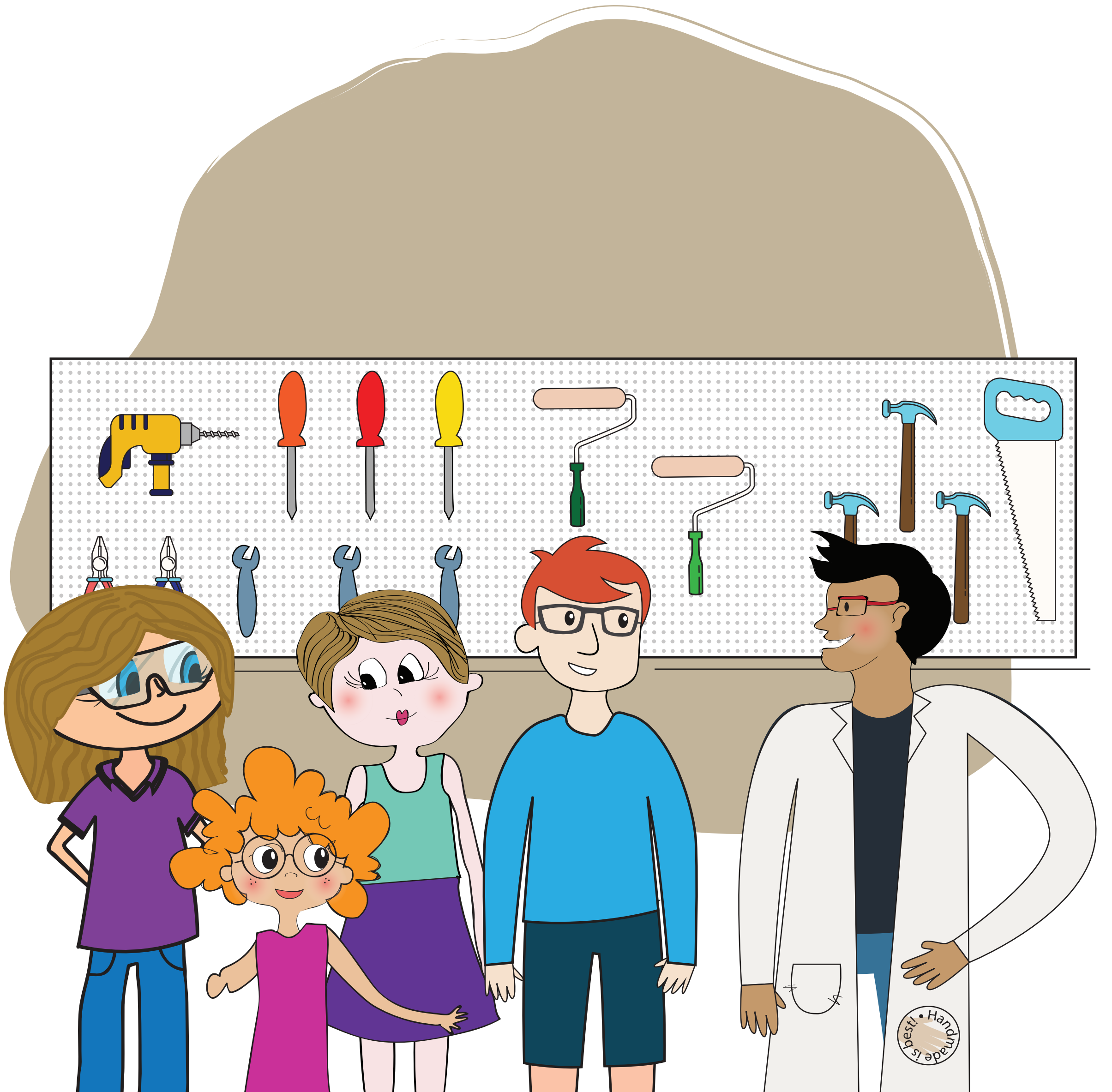
“It doesn't work, Mom! It only makes me slower. I don't want it anymore!”

“It didn't work this time, but we can make adjustments. Why don't we take it back to your prosthetist? Don't worry, we will find the right swimming hand for you Amber. You just have to be patient.”



Gentling and Amber decide to search for a better swimming hand on the Internet. They read a news story about a man who used a 3D printer to make a prosthetic to hold his kayak paddle. This gives Amber an idea.

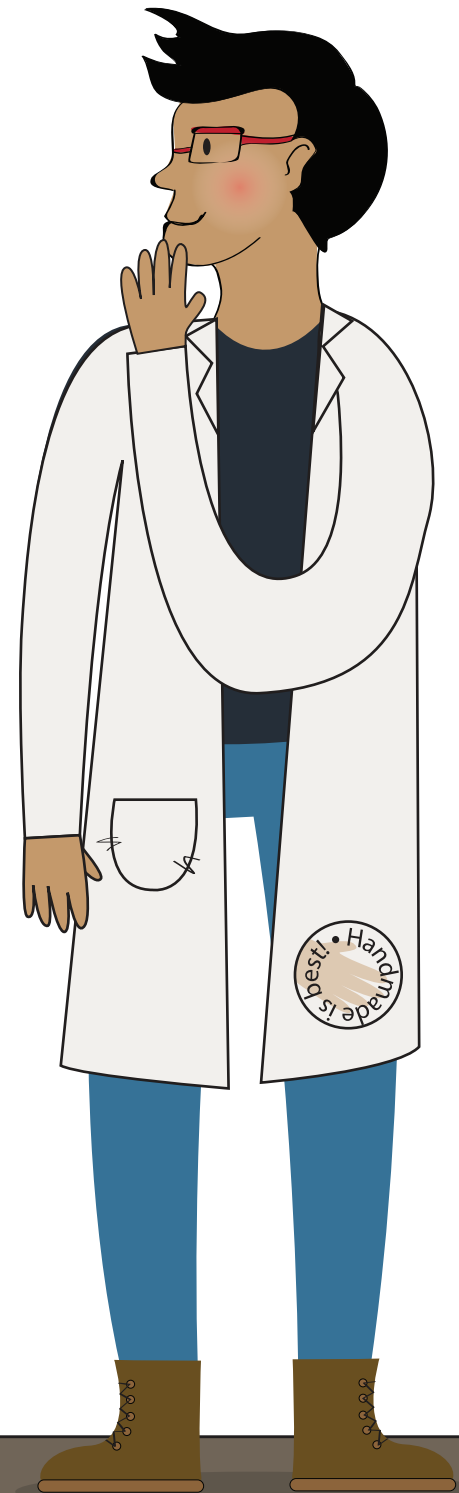
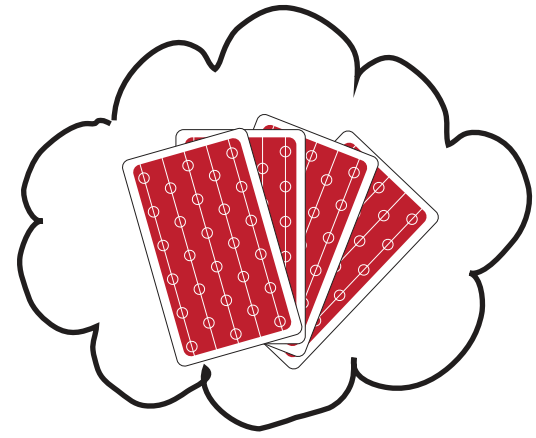
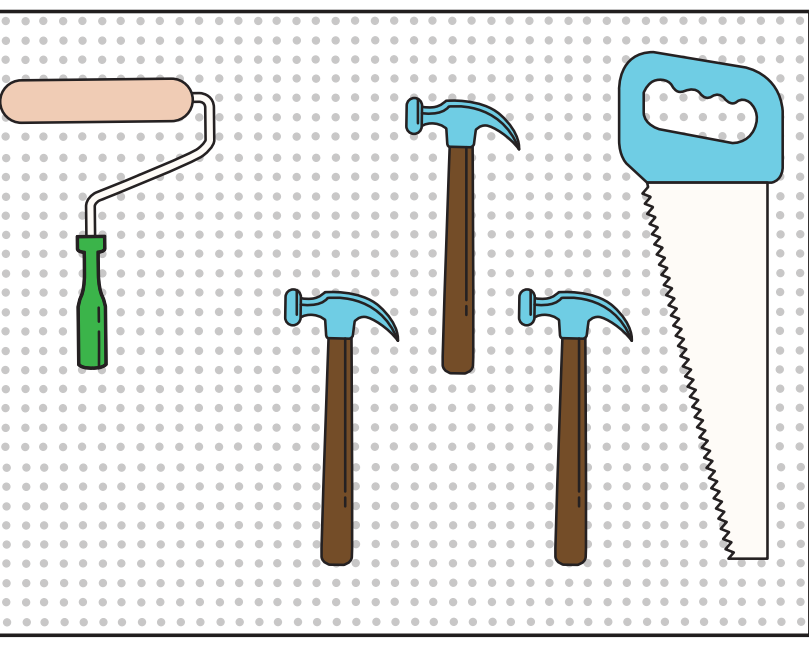
Amber learns that she can use 3D printers at some libraries and at cool places called makerspaces. Amber asks her parents to take her to a makerspace.



“Are you Amber?”

Amber nods.

“My name is Goodfinger, and this is Ann-Louise. I am a maker who helps makers. Your mom told me you want to learn about 3D printing. I would love to show you all about it. Would you like to make something today?”



“I want to make a prosthetic hand to help me swim!” says Amber.

“Well...” says Goodfinger, “Why don’t we start with something smaller?”

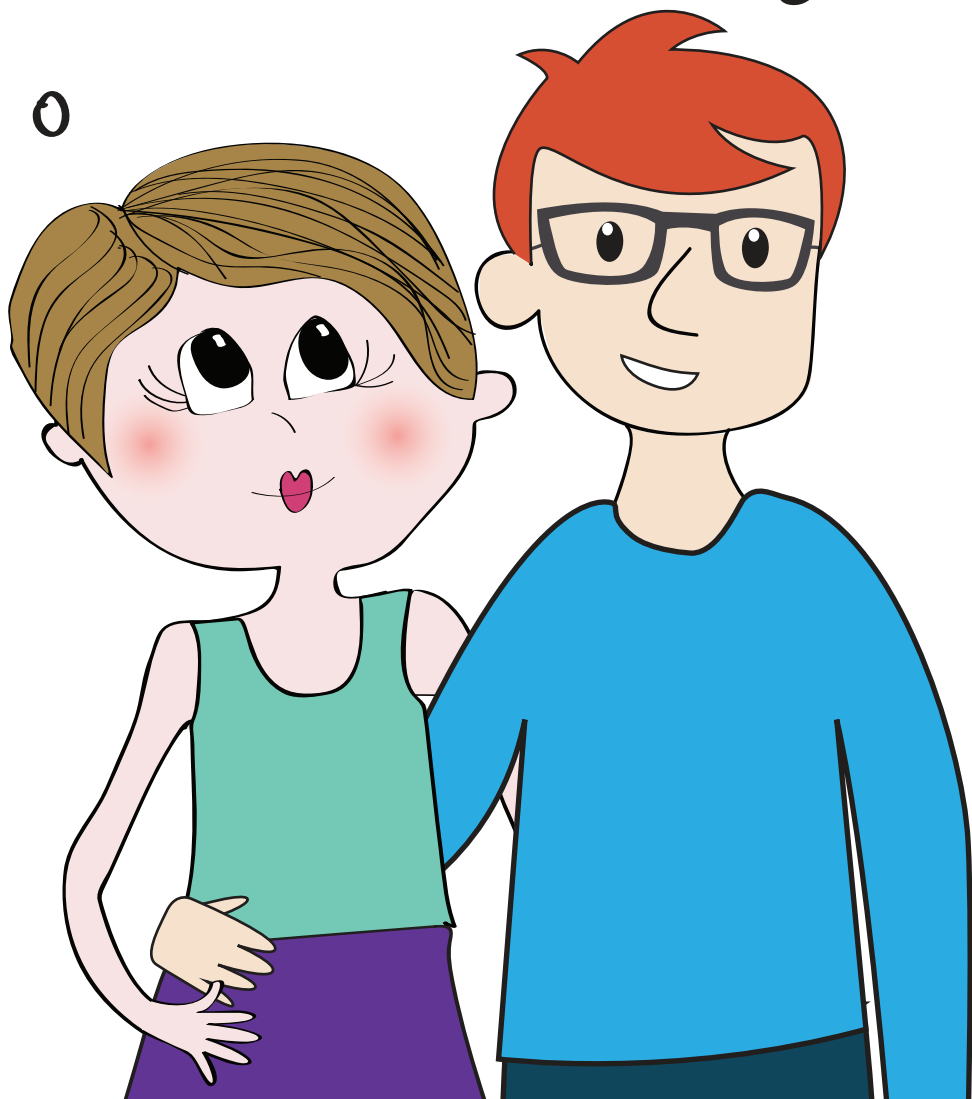


Goodfinger says, "Open a web browser and type www.thingiverse.com. Type c-a-r-d-h-o-l-d-e-r in the search bar."

"Cool! Can we print this one?" Amber asks.

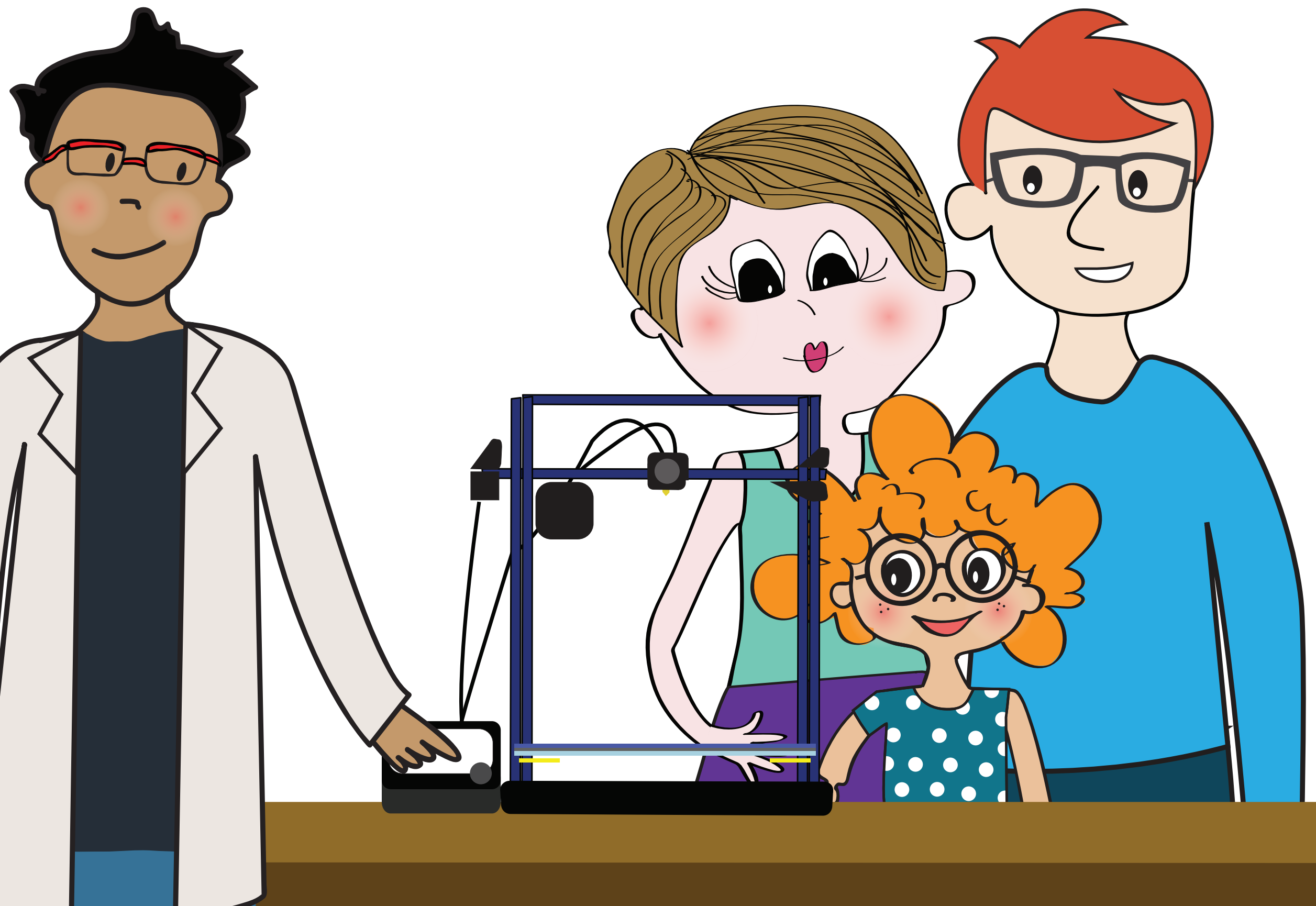
"Let's look at it together. This one looks like it lies flat on the table. Is this what you want? Would you like to modify it?"

"Hum... Let's see. I think I would like it a bit higher," says Amber.

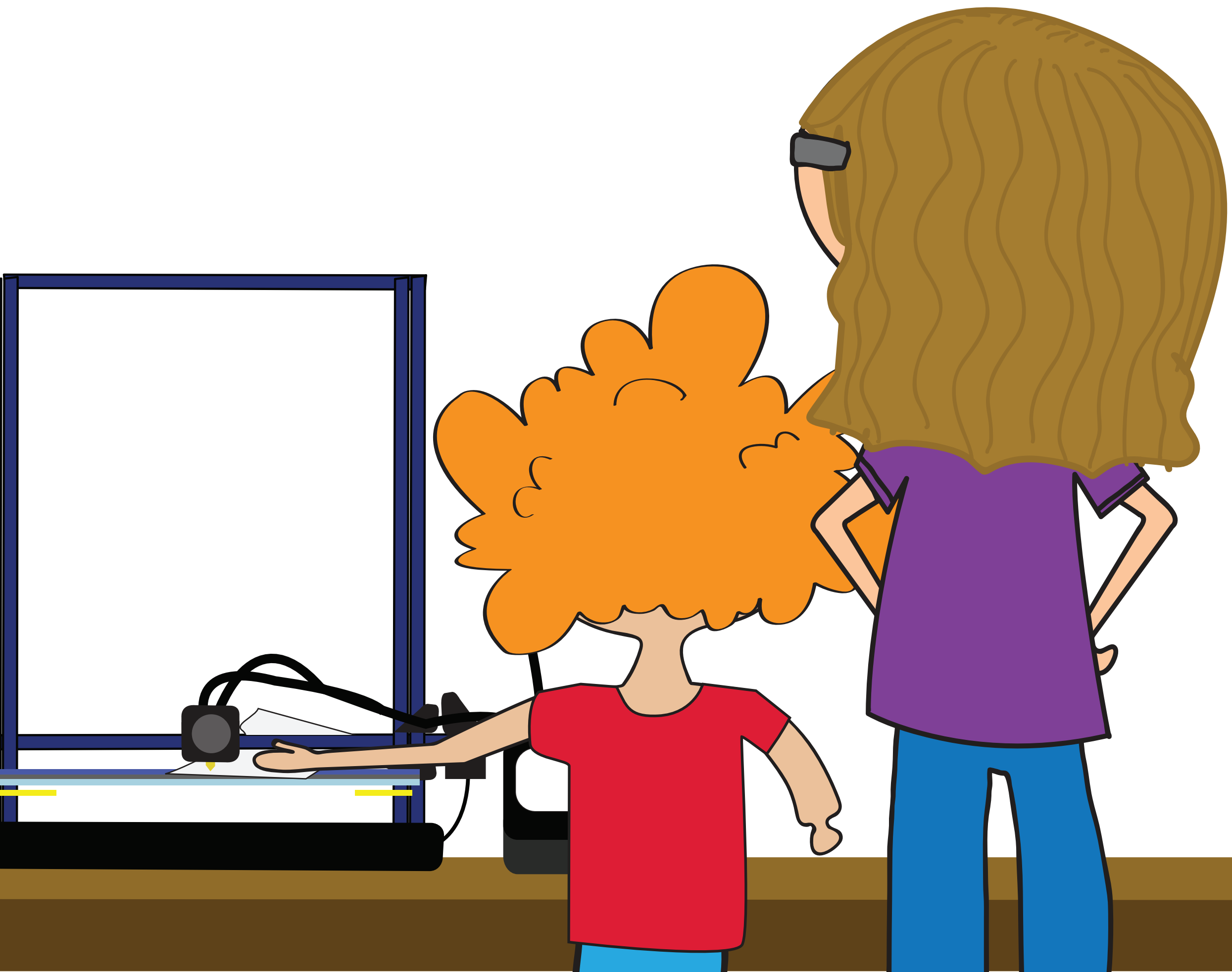


“Amber, what if you added spacers under this card holder? This could raise it a bit and you could see your cards better,” says her father.

“Yes, and you could stick rubber pads under it to prevent it from sliding on the table,” says her mother.

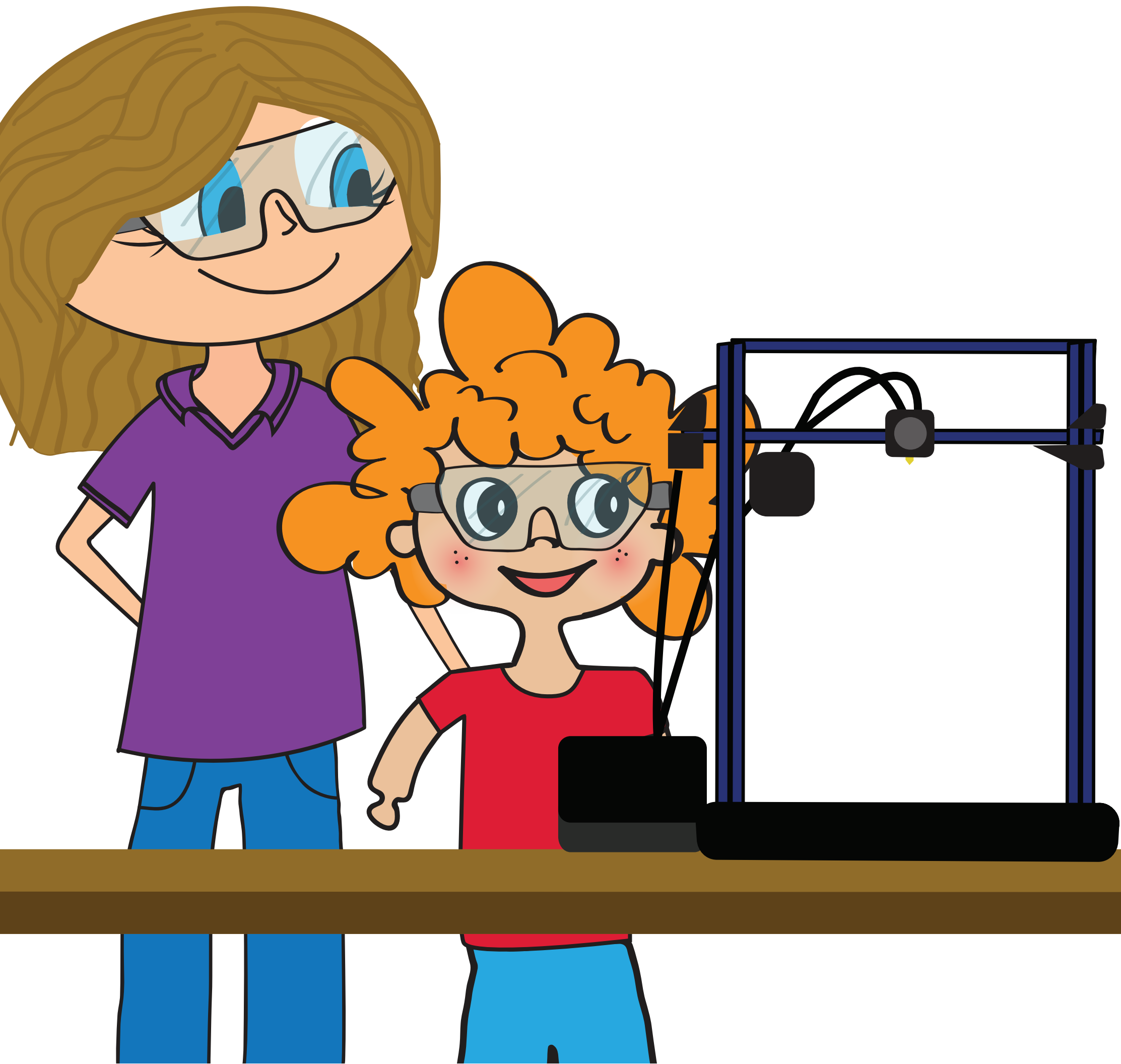


Goodfinger says, “It will take over an hour to print this card holder. Let’s watch it for the first few layers and then we can do other things as it prints. We will still need to watch it every few minutes. To be safe, we never leave printers unattended.”



Ann-Louise says, “Amber, if you want to design your own prosthetic, you will need to learn how to operate this 3D printer. You need to learn to prepare it, make mistakes, and fix them. Let me show you how to do a paper test to adjust the nozzle.”

“I am ready!” says Amber.



Amber wears safety glasses to protect her eyes and heat resistant gloves to avoid getting burned, because 3D printers get very hot.



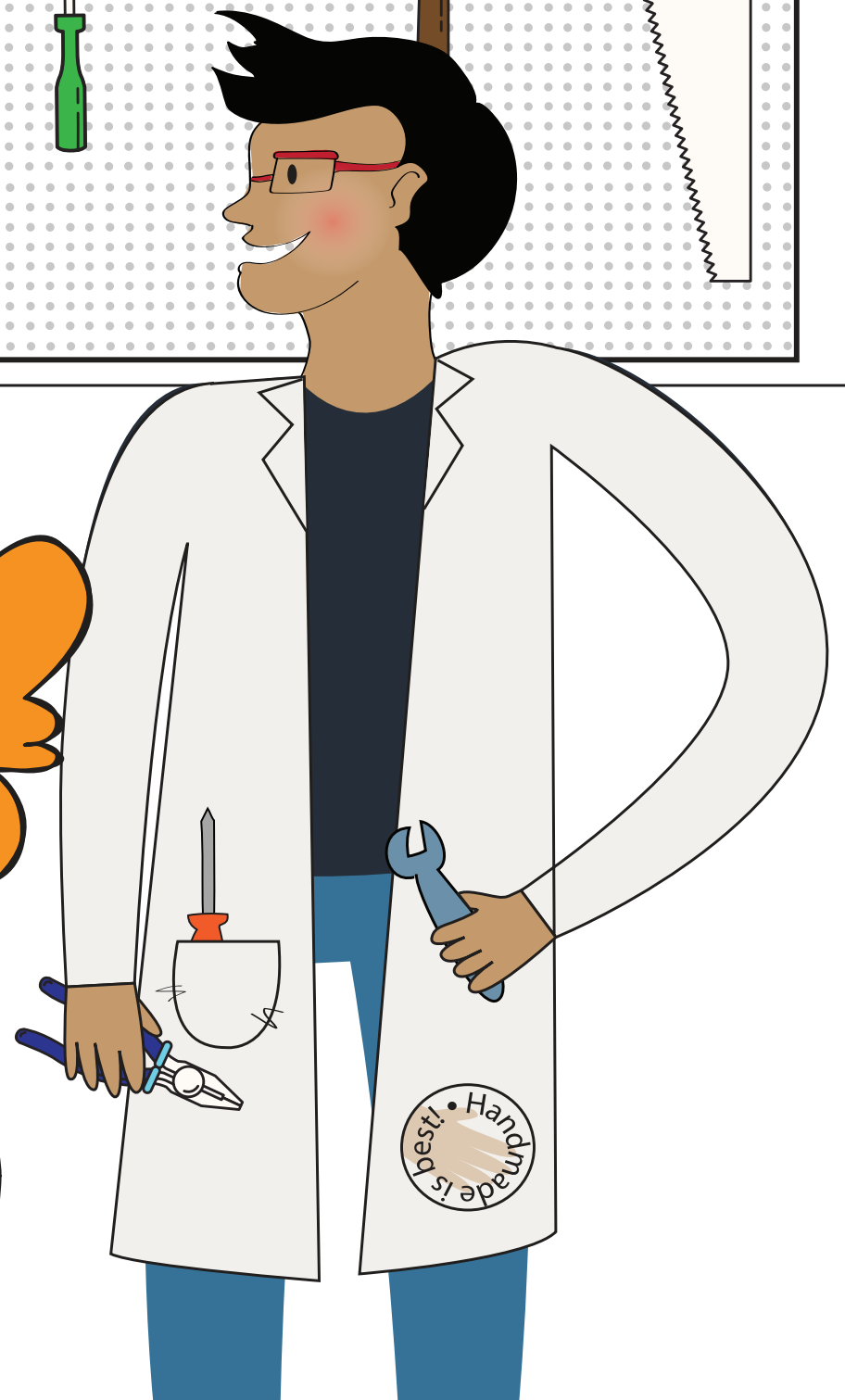
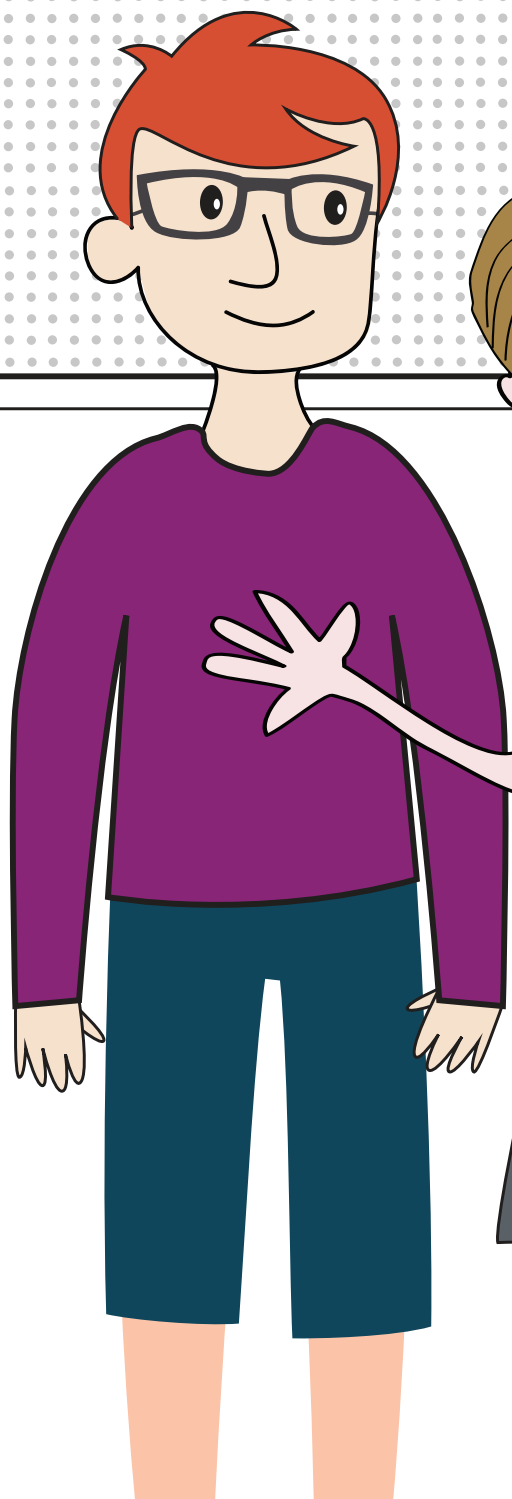
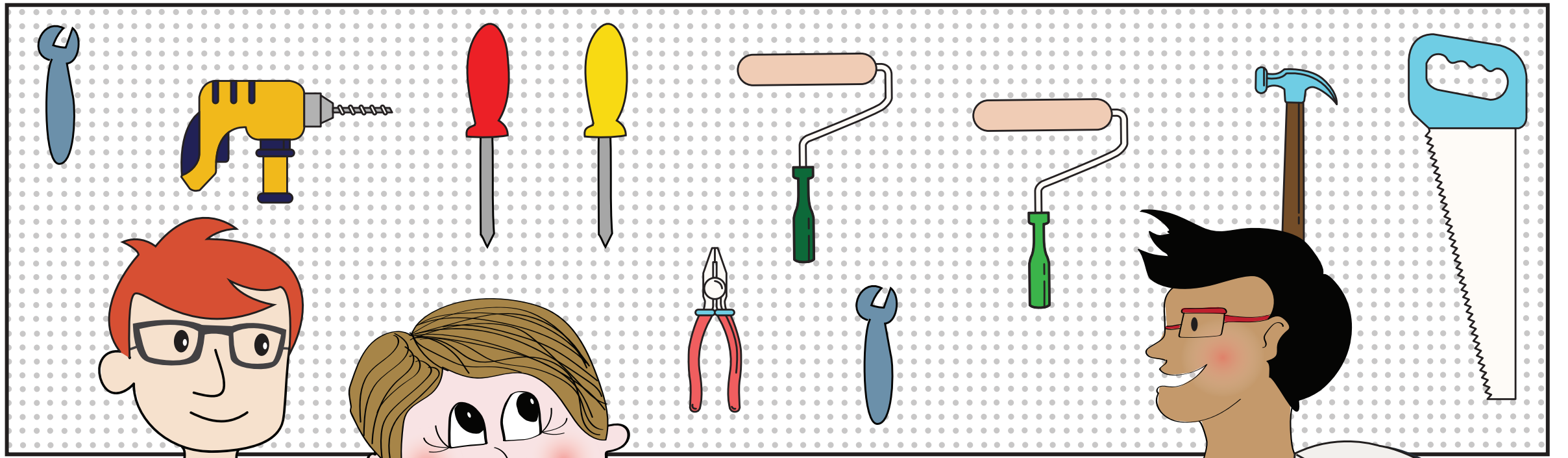
“The ideal scenario would be to involve your prosthetist. I suggest we start with some drafts and plan a meeting with all of us. We can create prototypes with 3D printing filament we have in the makerspace. When we are ready to print the final version we can order filament made with sturdier materials.”



Amber leaves the makerspace with the card holder she successfully printed. Her mind is filled with ideas for her 3D printed prosthetic swimming hand.



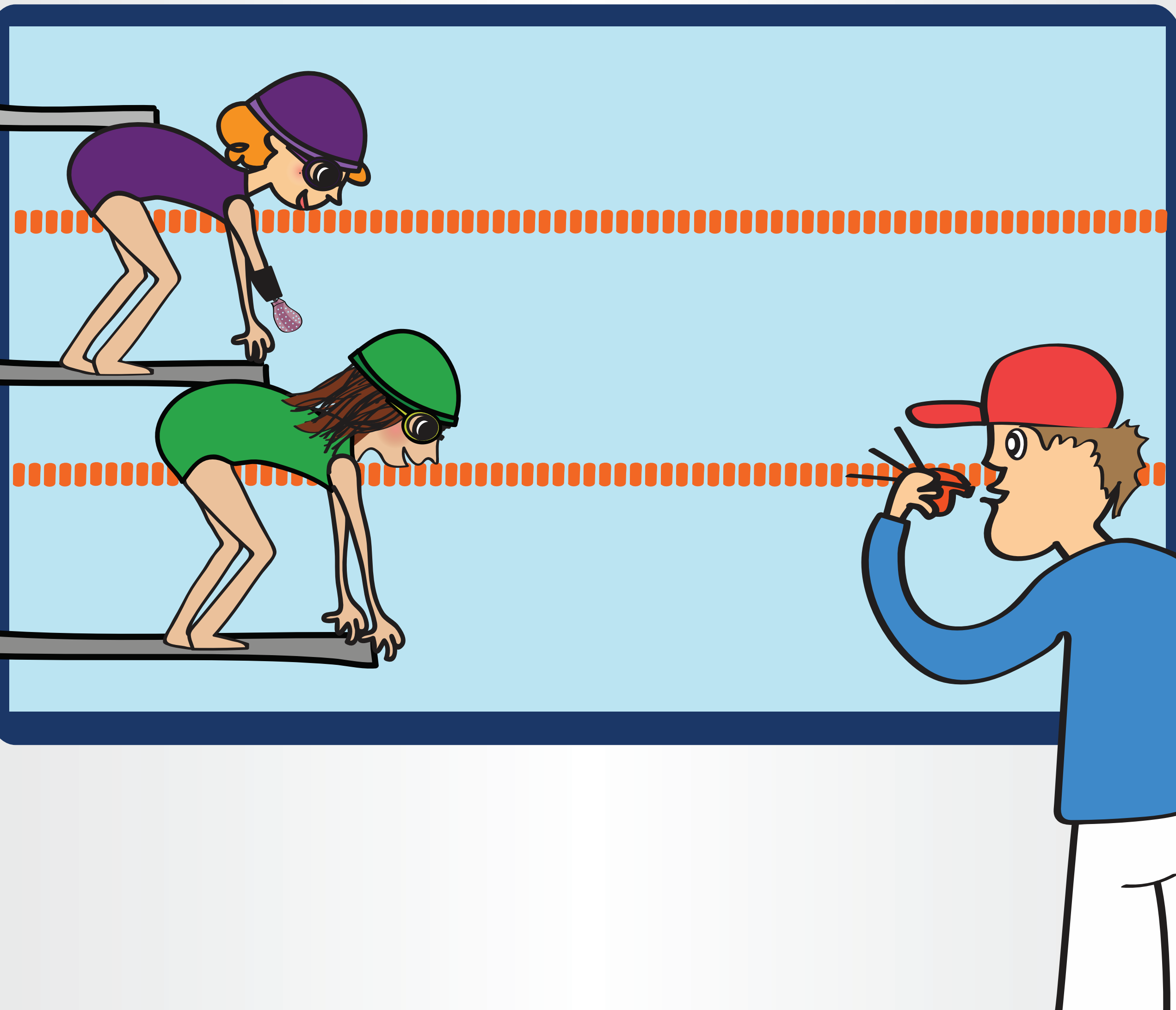
Mrs. Fitwell, Amber's prosthetist, says,
"I think this swimming prosthetic can work,
but you will need to improve the design
for the terminal attachment bolt. I will
leave you some information about how
much resistance and strength you can
handle in the water. Okay Amber?"



In the weeks that follow, Amber and her parents visit the makerspace many times.



Amber is excited to try her new prosthetic at swim practice. She puts it on. She notices that her new swimming hand is much lighter than her old one.

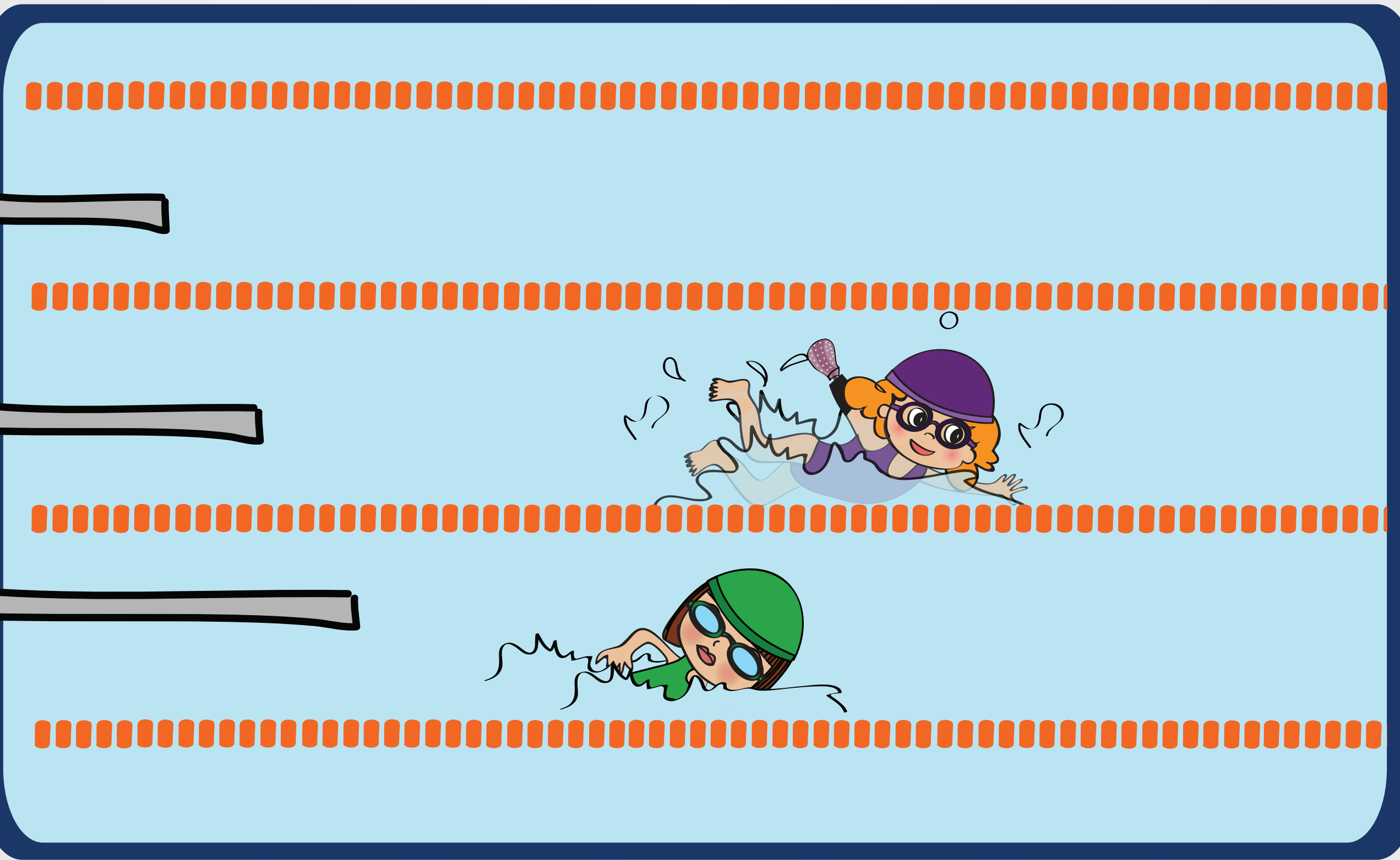


“Let’s do some racing to practise for the upcoming meet,” says the coach.

Lana looks over at Amber, “Hey slowpoke! Haven’t seen you in a while. I thought you quit!”

“I don’t quit,” responds Amber, “And I’ll show you I’m no slowpoke!”

“On your marks, get set, go!” shouts the coach.



Amber dives into the pool. Her prosthetic hand moves easily through the water. Amber swims as fast as she can.

“I arrived first!” screams Amber with joy!



“I’m sorry I was mean to you before. I just didn’t want to lose at the swim meet because of a slowpoke, but I guess I was the slowpoke today. Can you forgive me?” says Lana.

Amber looks at her and smiles, “Yes, I forgive you.”

“Great! Your new prosthetic hand is pretty cool.”

“Thanks, I made it myself,” says Amber.

“Wow! That is so neat!” says Lana. “Hey, can I ask you something?”

“Yeah, go ahead,” Amber answers.

“How did you lose your hand?”

“Well, it’s a pretty interesting story,” says Amber.

Amber

The
MAKER



Ann-Louise Davidson Ph.D.

I was born curious. I spent the better part of my childhood asking every question I could think of and admiring people who could do things with their hands, people who could fix broken bicycles, leaky faucets, radios and television sets. Still today, I spend most of my time asking questions and imagining things that don't exist. In my day job, I am an Associate Professor in the Department of Education. I hold the Concordia University Research Chair in Maker Culture and I am Associate Director of the Milieux Institute for Arts, Culture and Technology.



Elizabeth Lakoff

I am one of those incredibly lucky people who found their passion early in life - I love to learn and to help others love learning too. First as a teacher and now as an instructional designer, I was able to shape my passion into a professional career. In addition to a career in education and training, I am the mother of two amazing children, one of whom is an amputee and the inspiration for a lot of this story.

I have loved writing since I was very young. I would write stories about my family, my friends and neighbours, even my pets. Today, my favourite stories to tell are about my children, written as serials featured in notes in their school lunches. It is in storytelling that we can portray children for what they really are - the heroes of their own adventures.



Alina Gutiérrez Mejía

I was born in a picturesque and colourful place, which explains why I love bringing colour to people's life through images. I love to translate concepts and ideas to visuals, so I loved bringing Amber the maker to life through my illustrations. My day to day consists of working on my P.h.D about the long-term impact of visual tools in group facilitation, organizational change and community behavioural change.

I believe that helping people see enables people to better reflect and understand important topics. Through graphic facilitation I aim to increase employee participation and thoughtful decision-making.